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EXAMINER	
APPIAH, CHARLES NANA	
ART UNIT	**PAPER NUMBER**
2682	4

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/669,274	DUJMENOVIC, FELIKS	
	Examiner	Art Unit	
	Charles Appiah	2682	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atherly et al. (5,140,198)** in view of **Havens et al. (5,438,301) further in view of Chi (5,239,274).**

Regarding s claims 1, 7 and 13 Atherly discloses (with reference to Fig. 1) an apparatus, a receiver for use in wideband communication (see col. 1, lines 48-53), and a method for canceling an image signal from a received radio frequency signal, comprising: an oscillator (29) for producing a radio frequency signal (30, 34, col. 2, lines 42-54), a first mixer (22) having inputs to receive the oscillator component (30) and the received radio frequency signal (16), and outputting a signal (44), a second mixer (24) having inputs configured to receive an oscillator component (34) and the received radio frequency signal (18) and outputting a signal (46), a phase shift device (42) coupled with one of the mixers for receiving an output of the one mixer and outputting a phase shifted signal (output of 42), and a combiner (40), operatively coupled to the other of the mixers and the phase shift device (inputs into 40 from 36 and 42), for producing an image cancelled signal (see col. 1, lines 53-61, col. 2, lines 47-60 and col. 4, lines 14-28). Atherly shows combining an in-phase and quadrature components from the first mixer and second mixer to produce a combined signal with the image frequency components substantially attenuated or suppressed (see col. 5, lines 5-28). Atherly fails

to teach using a ring oscillator for producing a radio frequency signal having in-phase and quadrature phase components.

Havens discloses a carrier signal generator that generates in-phase and quadrature-phase carrier signal components using an N-stage ring oscillator for generating signals equal magnitude and arbitrary phase difference (see col. 1, lines 56-67). According to Havens implementing the oscillator as a ring oscillator produces balanced signals (including I and Q components), which differ in phase with the phase difference being a function of the number of stages of the ring oscillator (see col. 3, lines 38-64, col. 5, line 29 to col. 6, line 24).

It would therefore have been obvious to one of ordinary skill in the art to replace the oscillator and phase shift circuit of Atherly with a ring oscillator in order to produce desired in-phase and quadrature-phase signals having a wide frequency bandwidth as taught by Havens with reduced circuit components.

The combination of Atherly and Havens fail to teach wherein the ring oscillator including a plurality of delay cells, an output of each delay cell being coupled to an input of another delay cell, one of the couplings between delay cells being cross-coupled so that the output of one delay cell is inverted prior to input into another delay cell.

Chi discloses a voltage controlled ring oscillator made up of a plurality of voltage controlled differential buffers in which the output of each buffer is coupled to an input of another buffer cell and one of the couplings between the buffers is cross-coupled so that the output of one buffer is inverted prior to input to another delay cell (see Figs. 4-6). Chi is pertinent since Chi teaches that the VCO having the differential buffers

(delay cells) provides precise complementary phase signals which are not provided by a conventional ring oscillator and that the differential buffers also introduce less high frequency noise into the power supply network and offers improved power supply noise rejection (see col. 1, line 54 to col. 2, line 25). Chi further teaches that using differential buffers in a ring oscillator allows the use of an even number of differential buffers to be used which makes it possible to generate a multi-phase signal such as four buffers allowing the generation of a multi-phase signal having a number of phases that is four or a multiple of four (see col. 6, line 45 to col. 7, line 14).

It would therefore have been obvious to one of ordinary skill in the art to use the differential ring VCO of Chi in the combination of Atherly and Havens in order to provide a high frequency response VCO that provides precise desired phase signals and introduces less high frequency noise, improved signal-to-noise ratios, better noise rejection properties for any desired communication application.

Regarding claim 2, Atherly further shows the phase shift device is coupled to the second mixer (42 being coupled to mixer 24).

Regarding claims 3, 8 and 15, Atherly further discloses wherein the phase shift device shifts a phase of the second mixer output by 90 degrees (see col. 2, lines 57-59).

Regarding claims 4 and 9, the combination of Atherly, Havens and Chi show (as taught by Chi), the ring oscillator being made up of four delay cells (differential buffers). See Figs. 4-6.

Regarding claims 5 and 10, Chi further teaches that the propagation of signals through each buffer is proportional to the parasitic capacitance and inversely proportional to the source power supply current and that the delay can be adjusted by adjusting the current in response to bias voltage (see col. 5, line 35 to col. 6, line 18). The combination of Atherly, Havens and Chi do not explicitly teach that each delay cell delays its output by forty-five degrees. However, since Chi discloses adjusting the propagation delay by adjusting the current in response to bias voltage, those of ordinary skill in the art would have appreciated being able to provide any desired delay such as forty-five degrees in order to uniformly distribute the multi-phase signals over three sixty degrees subject to circuit constraints and system requirements.

Regarding claims 6 and 12, Atherly further discloses that the in-phase mixer is a conventional integrated circuit double-balanced mixer (see col. 3, lines 1-4) which functions as Gilbert cell mixers.

Regarding claim 14, Atherly shows that the one phase signal is the quadrature phase signal (output of 90 degrees mixer 24).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hashimoto et al. (5,262,735) discloses a ring oscillator having outputs that are selectively combined to produce different frequencies.

Du (5,568,099) discloses a high frequency differential VCO.

Sutardja et al. (5,635,879) discloses a voltage controlled oscillator formed of two differential transconductors.

Tso et al. (5,917,383) discloses a compact voltage controlled ring oscillator with quadrature outputs.

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Response to Arguments

5. Applicant's arguments filed on July 21 2003 have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in

the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, examiner maintains that the references as used in the rejections as set forth above provide the needed motivation for making the combination.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Appiah whose telephone number is 703 305-4772. The examiner can normally be reached on M-F 7:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 703 305-6739. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703 308-6296 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 306-0377.

CA
September 25, 2003

CHARLES APPIAH
PRIMARY EXAMINER